

Notice of Allowability

Application No.

10/523,373

Examiner

Michael Bernshteyn

Applicant(s)

KIEFER ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 06/14/2007.
2. ☒ The allowed claim(s) is/are 25-51.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Michael M. Bernshteyn
Patent Examiner
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DETAILED ACTION

1. This Office Action is a response to the remarks filed on June 14, 2007. Claims 32, 33 and 35 have been amended; no claims have been cancelled or added.
2. In view of the amendment(s), remarks and a Declaration under 37 C.F.R. 1.132, the rejection under 35 U.S.C. 112, 1st paragraph of claim 25, 38-40 and 50, the rejection under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) of claims 25-27, 33 and 41-43 as obvious over Sakaguchi et al. (WO 02/038650 or U. S. Patent Application Publication 2004/0062969 or EP 1 354 907 A1), and the rejection under 35 U.S.C. 103(a) of claims 28-32 as being unpatentable over Sakaguchi et al. in view of Gerber (U. S. Patent 3,783,137) have been withdrawn.
3. Claims 25-51 are now pending.

EXAMINER'S AMENDMENT

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Alexander Akhiezer on August 31, 2007.

5. Claim 25: line 3, after the word "mixing" insert --(i)-- and after the word "with" insert --(ii)-- ,

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Line 4, after the word "compounds" insert the word --and-- ,

Line 5, after the word "anhydrides" delete the words "containing at least two acid groups per carboxylic acid monomer," and insert the words --said carboxylic acids, their esters, their acid halides or their acid anhydrides containing at least two carboxylic groups per carboxylic monomer,--

Line 6, after the word "mixing" insert --(i)-- and after the word "with" insert --(ii)-- ,

Line 10, after the words "up to" delete the word "350EC" and insert -- 350°C --.

Lines 3, 9, and 11-13, delete all small letters a), b), c) and d), and insert the capital letters --A)--, -- B)--, --C)-- and --D)--.

6. Claim 26, line 1, after the word "that" delete the word "as" and insert --the--

Line 2, after the word "compounds" insert the words --are selected from--,

Line 5, after the word "methane" delete the words "is used".

7. Claim 27, line 1, after the word "that" delete the word "as" and insert --the--

Line 2, after the word "carboxylic acids" insert the words --, their esters, their acid halides or their acid anhydrides are selected from--,

Line 16, after the word "chlorides" delete the words "are used".

8. Claim 28, line 1, after the word "that" delete the word "as" and insert --the--

Line 2, after the word "carboxylic acids" insert the words --, their esters, their acid halides or their acid anhydrides are selected from--,

Line 5, after the word "chlorides" delete the words "are used".

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9. Claim 29, line 2, after the word "acid" delete the words "used includes at least one member of" and insert the words --is selected from--.

10. Claim 32, line 1, after the word "that" insert the words --said carboxylic acids, their esters, their acid halides or their acid anhydrides are selected from--

Line 7, after the word "chlorides" delete the words "are used".

11. Claim 33, line 1, after the word "that" delete the word "as" and insert the words --said carboxylic acids, their esters, their acid halides or their acid anhydrides are selected from--

Line 7, after the word "chlorides" delete the words "are used".

12. Claim 34, page 5, lines 3, 6, 14 and 17, page 6, lines 2, 5 and 9, after the word "substituted" delete the words "in turn",

Page 5, lines 3 and 14; page 6, lines 2 and 5, after "-CN," delete NZ_2 and insert --or $N(Z)_2$ --,

Page 5, lines 6 and 17; page 6, line 9, after "-OH," insert --or--.

13. Claim 36, page 6, lines 6, 9, page 7, lines 4, 7, 14, 18 and 22, after the word "substituted" delete the words "in turn",

Page 6, line 6; page 7, lines 4, 14 and 19, after "-CN," delete NZ_2 and insert --or $N(Z)_2$ --,

Page 6, line 9; page 7, lines 7 and 22, after "-OH," insert --or--.

14. Claim 44, line 3, delete step A), lines 3-7 and insert the following:

--A) mixing (i) a vinyl-containing sulfonic acid with (ii) one or more aromatic tetraamino compounds and with one or more aromatic carboxylic acids, their esters, their acid halides or their acid anhydrides, said

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carboxylic acids, their esters, their acid halides or their acid anhydrides containing at least two carboxylic groups per carboxylic monomer, or mixing (i) a vinyl-containing sulfonic acid with (ii) one or more aromatic or heteroaromatic diaminocarboxylic acids, their esters, their acid halides or their acid anhydrides,-- ,

Line 9, after the words "up to" delete the word "350EC" and insert -350°C -

15. Claim 48, line 3, delete step A), lines 5-11, and insert the following:

--A) mixing (i) a vinyl-containing sulfonic acid with (ii) one or more aromatic tetraamino compounds and with one or more aromatic carboxylic acids, their esters, their acid halides or their acid anhydrides, said carboxylic acids, their esters, their acid halides or their acid anhydrides containing at least two carboxylic groups per carboxylic monomer, or mixing (i) a vinyl-containing sulfonic acid with (ii) one or more aromatic or heteroaromatic diaminocarboxylic acids, their esters, their acid halides or their acid anhydrides,-- ,

Line 13, after the words "up to" delete the word "350EC" and insert -350°C --

Pages 9-10, delete all small letters a), b), c) and d), and insert the capital letters --A)--, --B)--, --C)-- and --D)--.

16. Claim 50, line 3, delete step A), lines 3-7, and insert the following:

--A) mixing (i) a vinyl-containing sulfonic acid with (ii) one or more aromatic tetraamino compounds and with one or more aromatic carboxylic acids, their esters, their acid halides or their acid anhydrides, said

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carboxylic acids, their esters, their acid halides or their acid anhydrides containing at least two carboxylic groups per carboxylic monomer, or mixing (i) a vinyl-containing sulfonic acid with (ii) one or more aromatic or heteroaromatic diaminocarboxylic acids, their esters, their acid halides or their acid anhydrides,-- ,

Line 9, after the words "up to" delete the word "350EC" and insert -350°C -

Allowable Subject Matter

17. Claims 25-51 are allowed. Claims 44-46 and 47-49, previously withdrawn from consideration as a result of a restriction requirement, require all the limitations of an allowable claim. Pursuant to the procedures set forth in MPEP § 821.04(a), **the restriction requirement between inventions of a proton-conducting polymer membrane, an electrode and a membrane electrode assembly, as set forth in the Office action mailed on August 14, 2006, is hereby withdrawn** and claims 44-49 hereby rejoined and fully examined for patentability under 37 CFR 1.104. In view of the withdrawal of the restriction requirement, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re*

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Ziegler, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

18. The following is a statement of reasons for the indication of allowable subject matter: the present claims are allowable over the closest reference: Sakaguchi et al. (WO 02/038650). WO 02/038650 was published on 05/16/2002 Gazette 2002/20 and is equivalent to U.S. Patent Application Publication 2004/0062969 and EP 1 354 907 A1, therefore the paragraphs of the Office Action are recited from US 2004/0062969.

Sakaguchi discloses a polybenzazole compound having sulfonic acid group and/or phosphonic acid group useful as a solid polymer electrolyte membrane, a resin composition containing the same, a resin molding, a solid polymer electrolyte membrane/electrode assembly and a method of preparing the assembly (page 1, [0001]). While the path for synthesizing such a compound is not particularly restricted, the compound can be synthesized by reaction between at least one compound selected from a group consisting of aromatic tetramines, aromatic diaminediols and aromatic diaminedithiols capable of forming imidazole rings, oxazole rings or thiazole rings in the compound and derivatives thereof and at least one compound selected from a group consisting of aromatic dicarboxylic acid and a derivative thereof in general (page 7, [0091]).

Sakaguchi discloses a method of synthesizing the polybenzazole compound having sulfonic acid group by employing at least one compound selected from the aforementioned group consisting of aromatic tetramine, aromatic diaminediol, aromatic diaminedithiol and derivatives thereof and at least

one compound selected from the group consisting of aromatic dicarboxylic acid and a derivative thereof is not particularly restricted, but the compound can be synthesized by dehydration and cyclizing polymerization with a solvent of polyphosphoric acid (pages 9-10, [0110]).

Sakaguchi discloses that while an optimum reaction temperature for synthesizing the inventive polybenzazole compound is not unconditionally definable because the optimum reaction temperature depends on the combination of monomers, it may be impossible to control the content of sulfonic acid groups in the obtained polybenzazole compound the reaction is carried out at a high temperature as reported in literature and the reaction temperature is preferably lowered in the range capable of attaining the effects of the present invention in this case. Control of the content of sulfonic acid groups in a polybnzazole compound may be possible by reducing the reaction temperature to some extent when the content of these groups is large (page 10, [0113]).

Sakaguchi discloses that while aromatic tetramine, aromatic diaminediol, aromatic diaminedithiol and derivatives thereof employable for synthesizing the inventive polybenzazole compound having sulfonic acid group and/or phosphonic acid group are not particularly restricted, 1,2,4,6-tetraaminobenzene, 3,3',4,4'-tetraaminodiphenyl ether, 3,3',4,4'-tetraaminodihpenyl thioether, 3,3',4,4'-tetraaminodiphenylsulfone, etc. (page 8, [0093]).

However, Sakaguchi does not disclose or fairly suggest instantly claimed proton-conducting polymer membrane which is made by the preparation of two

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distinct polymers: a polyazole polymer and a polyvinyl polymer, therefore the resulting material is a mixture of two different polymers as per claims 25 and 44.

It was further confirmed by Dr. Thomas J. Schmidt in the Declaration under 37 C.F.R. 1.132 filed on June 14, 2007.

19. As of the date of this Notice of Allowability, the Examiner has not located or identified any reference that can be used singularly or in combination with another reference including Sakaguchi et al. to render the present invention anticipated or obvious to one of ordinary skill in the art.

20. In the light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delay, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reason for Allowance".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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08/31/2007


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